

- 1 1. An apparatus for alternate control of a storage array, the apparatus comprising:
  - 2 a RAID controller operably connected to a storage array, the RAID controller
  - 3 configured to receive storage commands from a host computer and execute corresponding
  - 4 operations on the storage array;
  - 5 a storage adapter residing on the host computer, the storage adapter operably
  - 6 connected to the storage array independent of the RAID controller, the storage adapter
  - 7 configured to transmit storage commands to a selected storage device within the storage
  - 8 array; and
  - 9 a control module residing on the host computer, the control module configured to
  - 10 selectively direct storage commands to the RAID controller and the storage adapter.
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- 12 2. The apparatus of claim 1, wherein the storage adapter is selected from the group
- 13 consisting of a SCSI adapter, an SSA adapter, a fiberchannel adapter, and an IDE adapter.
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- 15 3. The apparatus of claim 1, wherein the control module comprises a multipath
- 16 software layer.
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- 18 4. The apparatus of claim 1, wherein the RAID controller is selected from the group
- 19 consisting of a SCSI RAID controller, an SSA RAID controller, a fiberchannel RAID
- 20 controller, and an IDE RAID controller.
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- 22 5. The apparatus of claim 1, wherein the RAID controller resides on the host.
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- 24 6. The apparatus of claim 1, further comprising a controller adapter residing on the
- 25 host, the controller adapter configured to operably connect the host to the RAID
- 26 controller.
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- 2 7. The apparatus of claim 1, wherein the control module is further configured to
- 3 conduct RAID operations via the storage adapter.
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- 5 8. The apparatus of claim 7, wherein the control module is further configured to
- 6 selectively emulate a RAID controller.
- 7
- 8 9. The apparatus of claim 1, wherein the control module is further configured to disable
- 9 the RAID controller.
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- 11 10. The apparatus of claim 1, wherein the control module is further configured to
- 12 quiesce the RAID controller.
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- 14 11. The apparatus of claim 1, wherein the control module is further configured to
- 15 conduct operations selected from the group consisting of read operations, write
- 16 operations, recovery operations, diagnostic operations, formatting operations, and
- 17 firmware update operations.
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- 19 12. The apparatus of claim 1, wherein the control module comprises a driver configured
- 20 to translate operating system calls to storage commands.
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- 1 13. A method for alternate control of a storage array, the method comprising:
- 2 transmitting storage commands to a RAID controller configured to conduct
- 3 storage operations on a storage array;
- 4 transmitting storage commands via a storage adapter to a selected storage device
- 5 within the storage array; and
- 6 selectively directing storage commands to the RAID controller and the storage
- 7 adapter.
- 8
- 9 14. The method of claim 13, further comprising the storage adapter emulating a RAID
- 10 controller.
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- 12 15. The method of claim 14, wherein emulating a RAID controller further comprises
- 13 retrieving RAID configuration information.
- 14
- 15 16. The method of claim 14, further comprising conducting RAID operations via the
- 16 storage adapter.
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- 18 17. The method of claim 13, wherein selectively directing storage commands occurs in
- 19 response to detecting a faulty RAID controller.
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- 21 18. The method of claim 13, further comprising disabling the RAID controller.
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- 23 19. The method of claim 13, further comprising quiescing the RAID controller.
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1 20. The method of claim 13, further comprising conducting storage operations via the  
2 storage adapter, wherein the storage operations are selected from the group consisting of  
3 read operations, write operations, recovery operations, diagnostic operations, formatting  
4 operations, and firmware update operations.

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6 21. The method of claim 13, further comprising disabling the storage adapter.

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8 22. The method of claim 13, further comprising quiescing the storage adapter.

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10 23. The method of claim 13, further comprising translating operating system calls to  
11 storage operations.

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13 24. A system for alternate control of a storage array, the system comprising:

14 a host computer;

15 a storage array comprising a plurality of storage devices;

16 a RAID controller operably connected to the storage array, the RAID controller  
17 configured to receive storage commands and conduct storage operations on the storage  
18 array in response to commands received from the host computer;

19 a storage adapter operably connected to the storage array independent of a storage  
20 controller, the storage adapter configured to transmit storage commands to a selected  
21 storage device within the storage array; and

22 a control module residing on the host computer, the control module configured to  
23 selectively direct storage commands to the RAID controller and the storage adapter.

1 25. A computer readable image comprising computer readable program code for  
2 alternate control of a storage array, the program code configured to:

3 transmit storage commands to a RAID controller configured to conduct RAID  
4 operations on a storage array;

5 transmit storage commands via a storage adapter to a selected storage device  
6 within the storage array; and

7 selectively direct storage commands to the RAID controller and the storage  
8 adapter.

9  
10 26. The computer readable image of claim 25, wherein the program code is further  
11 configured to emulate a RAID controller.

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13 27. The computer readable image of claim 25, wherein the program code is further  
14 configured to disable the RAID controller.

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16 28. The computer readable image of claim 25, wherein the program code is further  
17 configured to quiesce the RAID controller.

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19 29. A method for servicing a storage array, the method comprising:

20 operably connecting a storage array to a storage adapter independent of a RAID  
21 controller, the storage adapter configured to transmit storage commands to a selected  
22 storage device within the storage array; and

23 installing a control module residing on the host computer, the control module  
24 configured to selectively direct storage commands to the RAID controller and the storage  
25 adapter.

1 30. The method of claim 29, further comprising disabling the RAID controller.

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3 31. The method of claim 29, further comprising transferring control of the storage array  
4 to the storage adapter.

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6 32. The method of claim 29, further comprising servicing the RAID controller.

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8 33. The method of claim 29, further comprising updating firmware within a storage  
9 device.

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11 34. The method of claim 29, further comprising conducting diagnostic operations.

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13 35. The method of claim 29, further comprising conducting recovery operations.